AIDS vaccine research: Promising protein

A viral antigen that "does the right stuff" has brightened hopes for the development of an AIDS vaccine, government scientists said at a press briefing last week.

The antigen, a protein from the outer coat, or "envelope," of the AIDS retrovirus, triggered an immune response when injected into animals, report researchers at Duke University in Durham, N.C., and the National Cancer Institute (NCI) in Bethesda, Md. That finding was encouraging in itself. Beyond that, however, what one researcher calls "the right stuff" made itself apparent when the antibodies made by the animals neutralized AIDS virus in the test tube.

Thus far, researchers have induced antibody formation in goats, rabbits, mice and guinea pigs. They have begun tests on rhesus monkeys to see if the protein, called gp120, will similarly prod a primate immune system into making the neutralizing antibodies. But since none of these animals is susceptible to human AIDS, the real test of the antigen's potential as a vaccine will come with chimpanzees, who *are* vulnerable to the virus. The researchers hope that exposure to the antigen alone will have the chimpanzees' immune systems revved up and ready with antibodies, able to neutralize the virus before it can invade the animals' cells.

Antibodies with at least a slight ability to neutralize the AIDS virus in the test tube have been found in the blood of some AIDS and "pre-AIDS" patients (SN: 7/20/85, p. 40). Clearly, the antibodies found in AIDS patients have been ineffective against the virus. But, says Donald Francis of the Berkeley, Calif., office of the Centers for Disease Control, the situation in AIDS patients is "very different from pre-exposure presentation [of the antigen] to an individual who has not seen the virus, and whose system has not been deranged by the virus."

Antibodies formed in the body are a response to the living, whole virus. But researchers can't use the whole virus as a vaccine, even if it is killed, because of a double risk: The virus might revitalize itself, and the incorporation of viral genes into cellular DNA might at some point trigger cancer. Instead, researchers have looked for nongenetic bits of the virus, like gp120, that the immune system recognizes as foreign.

Even if gp120 protects chimpanzees against AIDS, there are still potential roadblocks. Most worrisome is the variability of the virus: Will an antigen that comes from one viral strain, and confers immunity against it, give any protection against another?

Research has focused on the envelope protein in part because something on the outer coat of the virus must remain constant if the virus is to continue to recognize and bind with its host cells. While gp120 is one of the most variable of the viral proteins, there are stretches within it that remain unchanged throughout the different viral strains.

"The question is," says Francis, "are those conserved regions important in producing neutralizing antibodies?" If they are, gp120 from any strain might elicit antibodies that recognize the protein of any other strain. Hepatitis B, for example, is a virus with multiple subtypes, but with enough stability among the strains that one vaccine protects against all of them. Even if the antibodies turn out to be strain-specific, gp120 may still be useful, says Peter Fischinger of NCI's Frederick (Md.) Cancer Research Center. "With some retroviruses," he says, "we have seen that as you continue immunizing, the neutralizing response becomes broader."

The earliest possible testing of an AIDS vaccine in humans would be in 1988, according to Anthony S. Fauci of the National Institute of Allergy and Infectious Diseases in Bethesda, Md. "You're going to have to tack on at least a few years more," he adds, because the disease's long latency period will increase the time necessary to determine the vaccine's efficacy.

— L. Davis

Clean-coal program change

In response to complaints from the coal industry and utilities, the Department of Energy (DOE) has modified its repayment plan for the new clean-coal technology program (SN: 3/1/86, p. 132). Originally, DOE, which would provide up to half of the funds for selected research projects proposed by industry, had called for an equivalent share in any revenues generated by a project. Now, Energy Secretary John S. Herrington says the government will ask for repayment of its share only if the project is successful and profitable. Under the original conditions, many companies had been reluctant to submit proposals. □

Fibrocystic changes rarely forecast cancer

The majority of women with chronic "lumpy breasts" are at no greater risk of developing breast cancer than other women, according to the College of American Pathologists (CAP). Prompted by women concerned about the diagnosis of "fibrocystic disease" and about increasing health insurance premiums, the Skokie, Ill.-based College held a consensus meeting to define the relationship between fibrocystic changes and breast cancer.

Both conditions occur relatively frequently in the United States — about 9 percent of women get breast cancer, and 50 to 80 percent of women undergo breast tissue changes that range from unnoticeable to painful during the menstrual cycle. But whether "fibrocystic disease" is precancerous depends on its exact nature, the 40 pathologists, oncologists, surgeons and gynecologists conclude in their report, which appears in the March ARCHIVES OF PATHOLOGY AND LABORATORY MEDICINE.

There are more than a dozen types of tissue changes that fall under the moniker "fibrocystic disease," and because most of them are not diseases, the group prefers the name "fibrocystic changes" or "fibrocystic conditions."

Among the evidence considered by the committee was a study reported last year by researchers from Nashville's Vanderbilt University. Looking at biopsy tissue from 3,303 women with benign breast changes, they found that 70 percent of the women had cell types that put them at no greater risk than normal of breast cancer, another 26 percent had changes relating to a 1.5-to-2-times-higher risk, and only 4 percent were in the 5-times-higher-risk group.

Because the statistics were based on women whose breasts were biopsied, the percentage of women with fibrocystic changes in the general population who are in the no-increased-risk group is probably higher than 70 percent, notes CAP spokesperson Kay H. Woodruff, a pathologist at Brookside Hospital in San Pablo, Calif. Unless the physician notices suspicious changes, most women with fibrocystic changes are not biopsied.

"A lot of people assume a lump equals cancer, but there are many types of lumps," Woodruff says. "Most are not cancer."

While lumps can make doing a breast self-examination more difficult, the practice is just as important in women with fibrocystic changes as in other women, notes consensus head Robert V. P. Hutter, a pathologist at St. Barnabas Medical Center in Livingston, N.J.

As for problems with getting individual health insurance, an Aetna spokesperson says that depending on the examining physician's recommendation, the company offers women with fibrocystic changes a standard policy, a policy with a higher premium, or one that excludes breast-related problems. A Mutual of Omaha spokesperson says his company offers a policy that excludes the breast, but may change its approach after reviewing the current report.

— J. Silberner